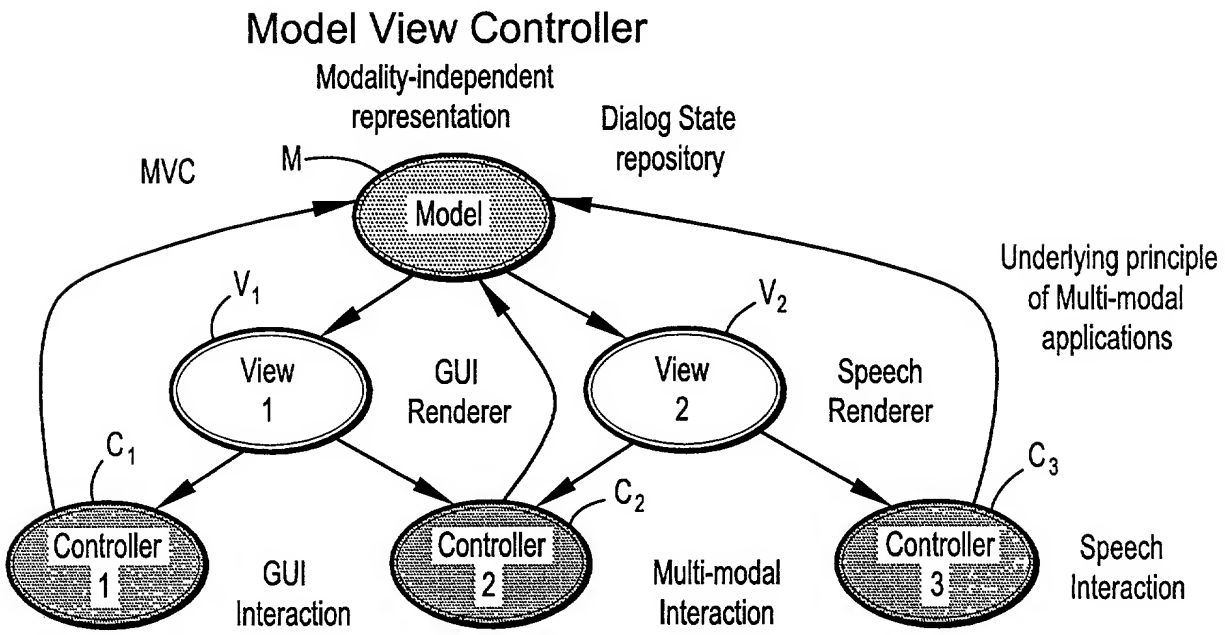
Model View Controller
Modality-independent representation
Dialog State repository
MVC
M
Model
Underlying principle of Multi-modal applications
V1
V2
View 1
GUI Renderer
View 2
Speech Renderer
C1
C2
C3
Controller 1
GUI Interaction
Controller 2
Multi-modal Interaction
Controller 3
Speech Interaction

FIG. 1

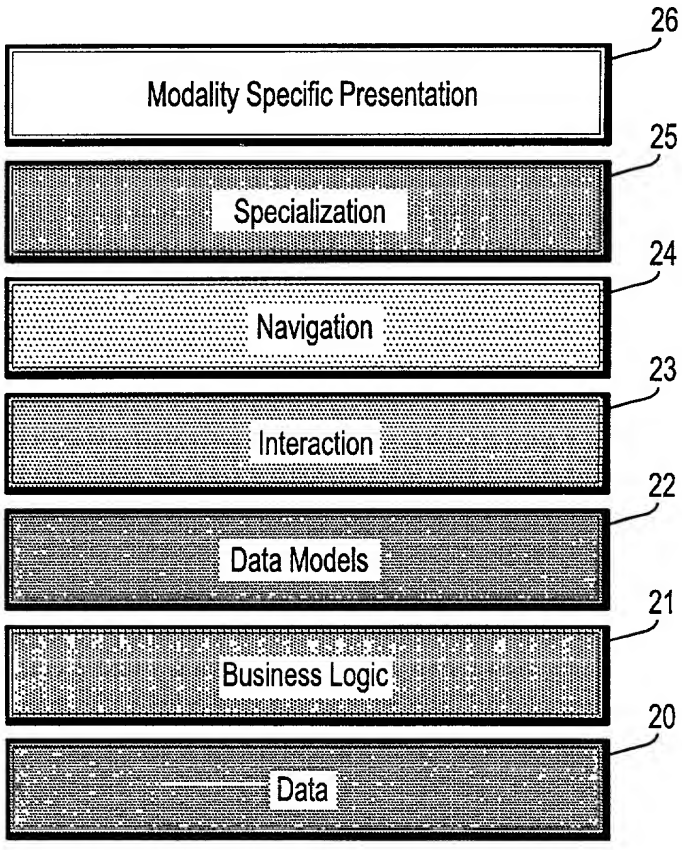
26
Modality Specific Presentation
25
Specialization
24
Navigation
23
Interaction
22
Data Models
21
Business Logic
20
Data

FIG. 2

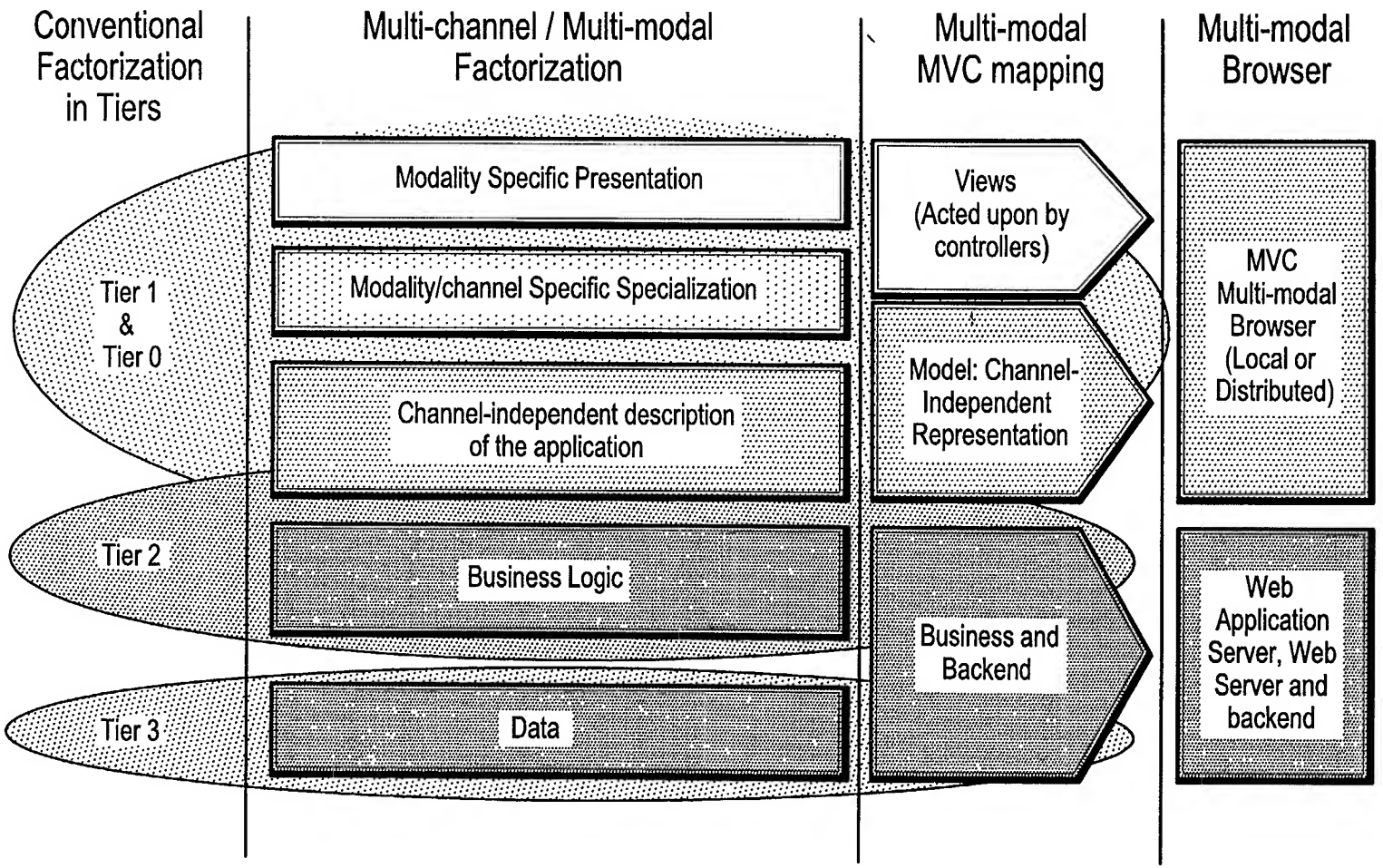
Conventional Factorization in Tiers
Multi-channel / Multi-modal Factorization
Multi-modal MVC mapping
Multi-modal Browser
Modality Specific Presentation
Modality/channel Specific Specialization
Channel-independent description of the application
Business Logic
Data
Tier 1 & Tier 0
Tier 2
Tier 3
Views (Acted upon by controllers)
Model: Channel-Independent Representation
Business and Backend
MVC Multi-modal Browser (Local or Distributed)
Web Application Server, Web Server and backend

FIG. 3

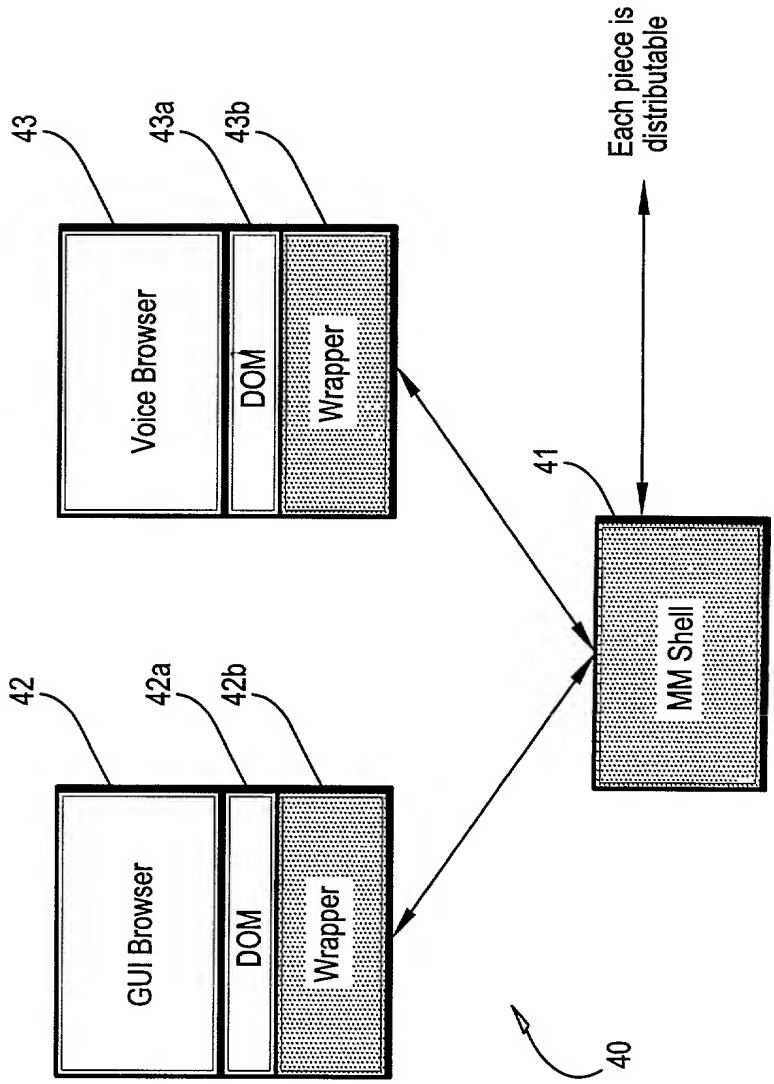
43
43a
43b
Voice Browser
DOM
Wrapper
Each piece is distributable
41
MM Shell
42
42a
42b
GUI Browser
DOM
Wrapper
40

FIG. 4

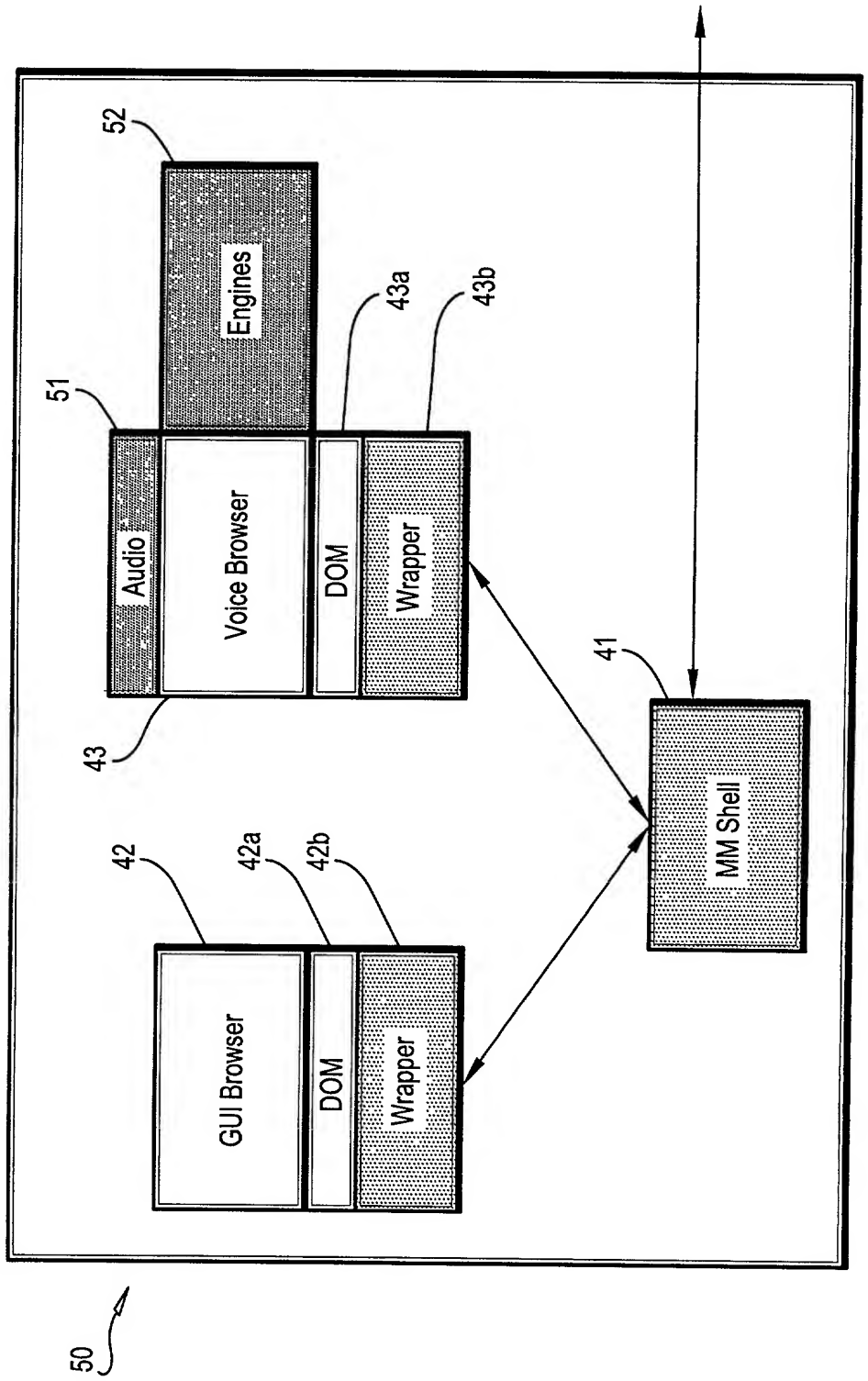
50
52
Engines
51
Audio
Voice Browser
43a
DOM
43b
Wrapper
43
41
MM Shell
42
GUI Browser
42a
DOM
42b
Wrapper

FIG. 5

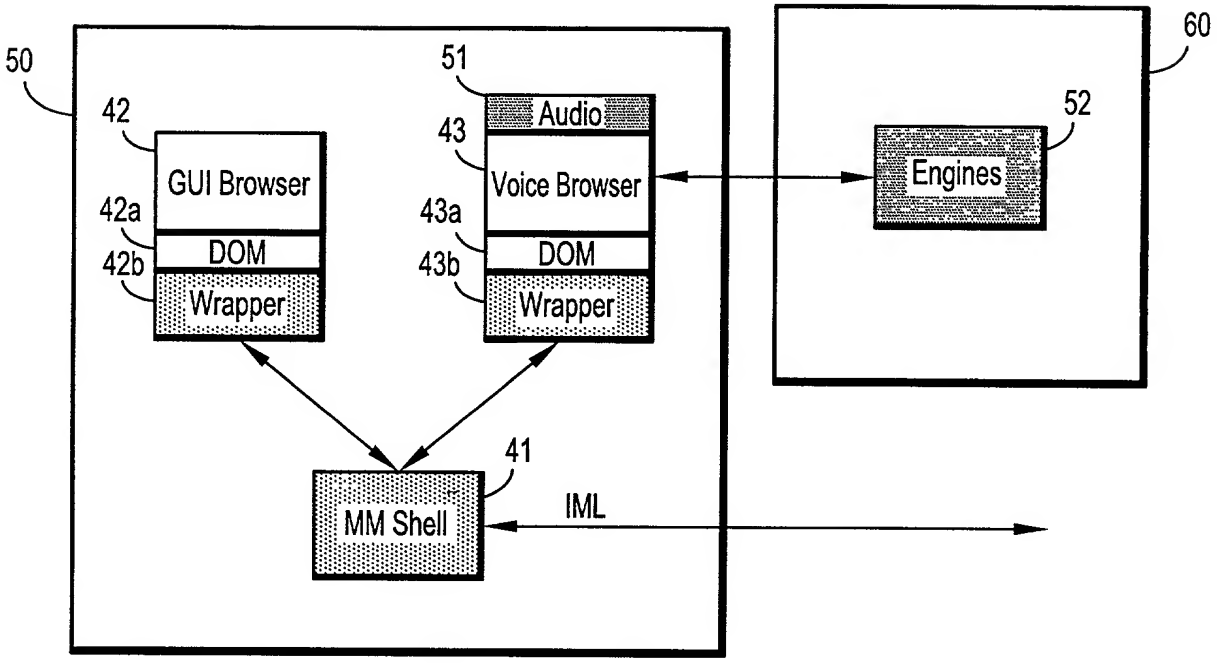
50
51
Audio
42
43
GUI Browser
Voice Browser
42a
43a
DOM
DOM
42b
43b
Wrapper
Wrapper
60
52
Engines
41
MM Shell
IML

FIG. 6

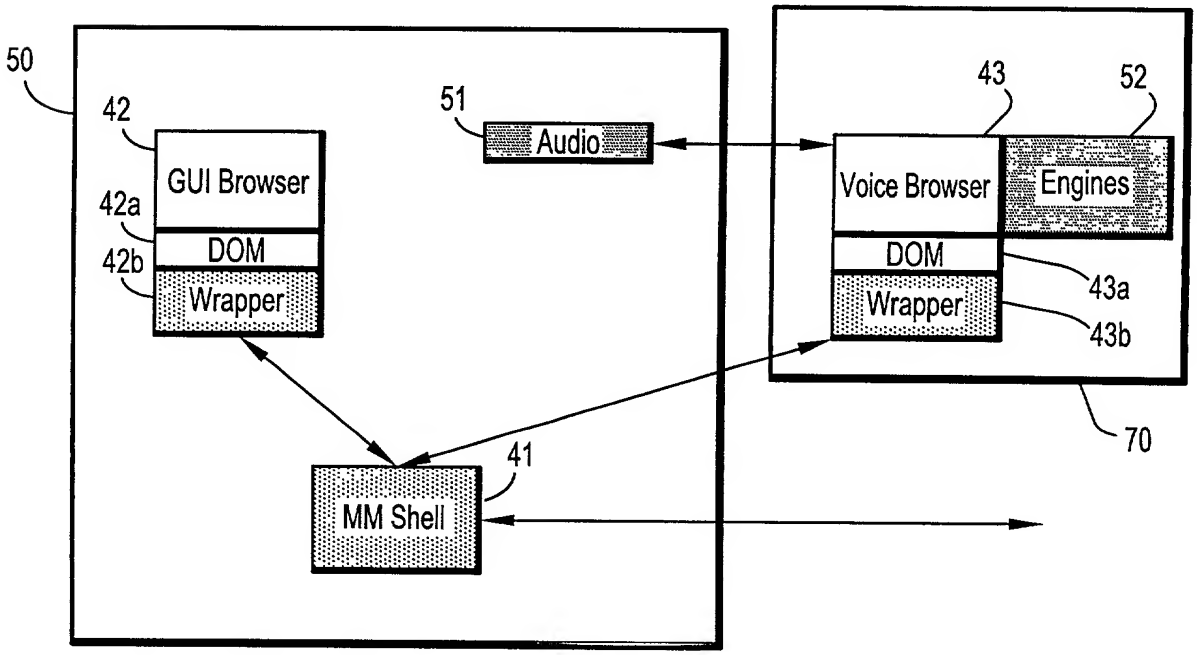
50
42
51
Audio
GUI Browser
42a
DOM
42b
Wrapper
43
52
Voice Browser
Engines
DOM
Wrapper
43a
43b
70
41
MM Shell

FIG. 7

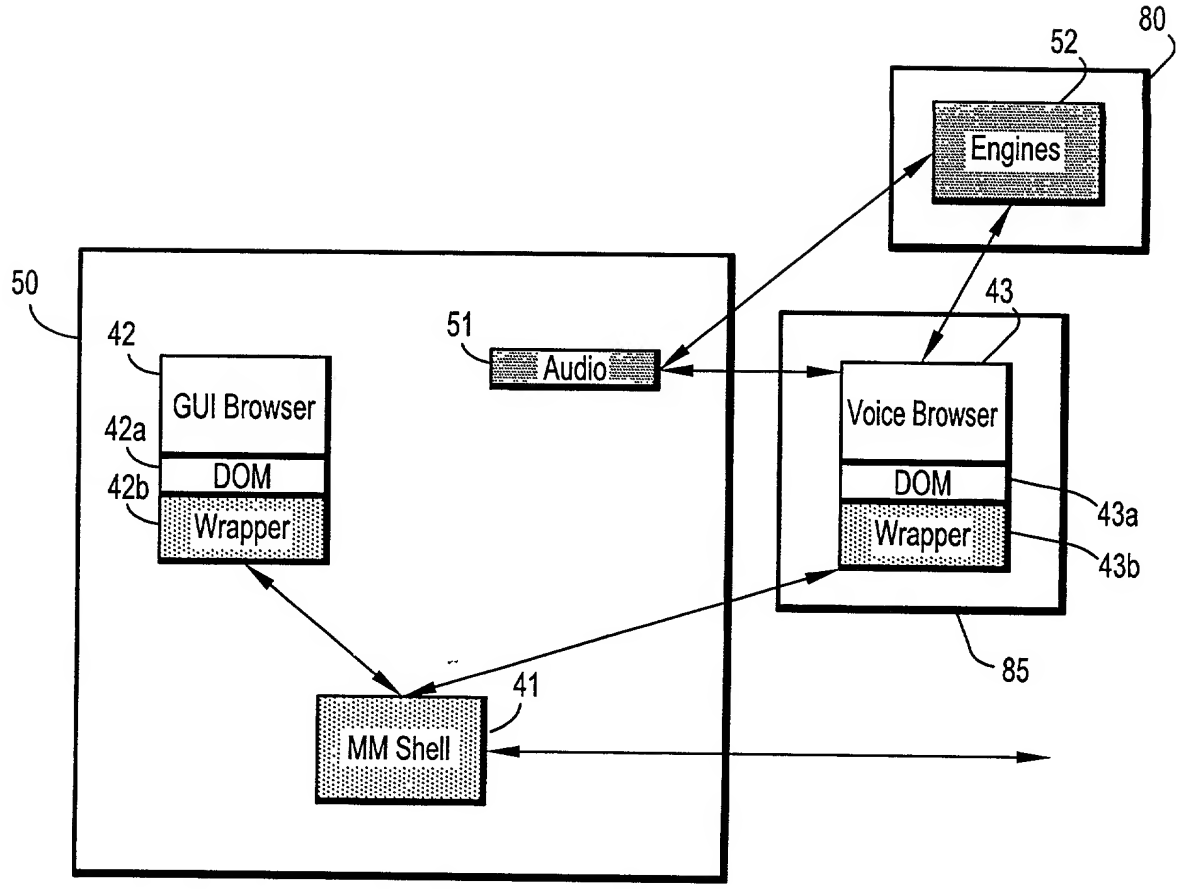
80
52
Engines
50
42
GUI Browser
42a
DOM
42b
Wrapper
51
Audio
43
Voice Browser
DOM
Wrapper
43a
43b
85
41
MM Shell

FIG. 8

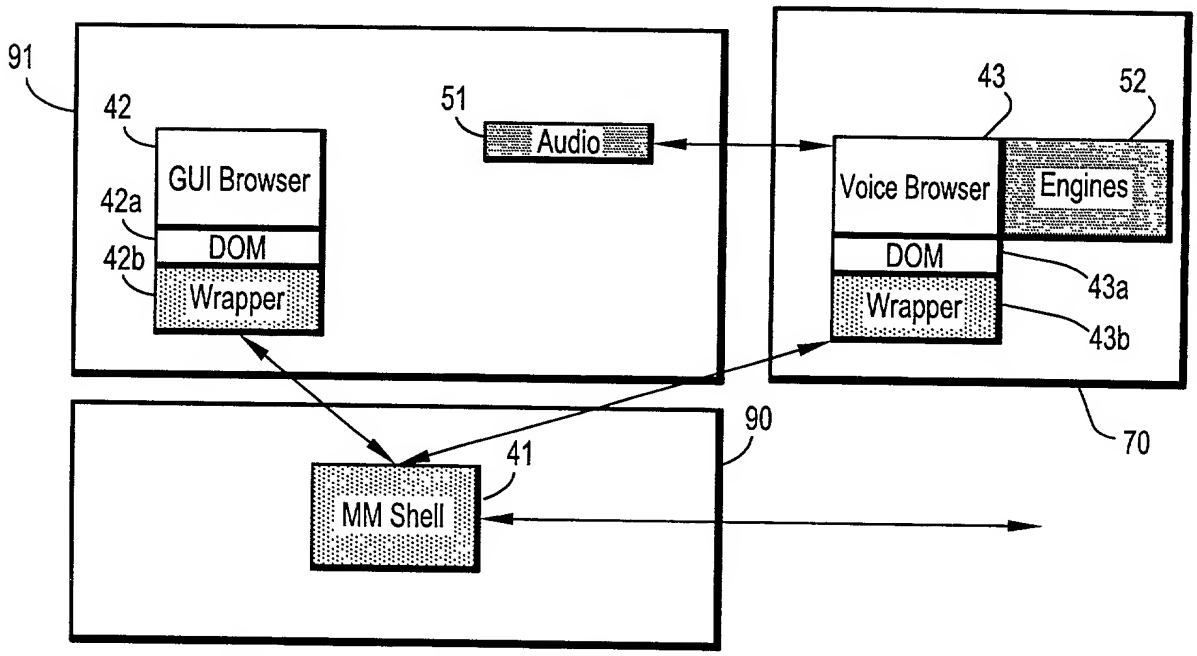
91
42
GUI Browser
42a
DOM
42b
Wrapper
51
Audio
43
52
Voice Browser
Engines
DOM
Wrapper
43a
43b
70
90
41
MM Shell

FIG. 9

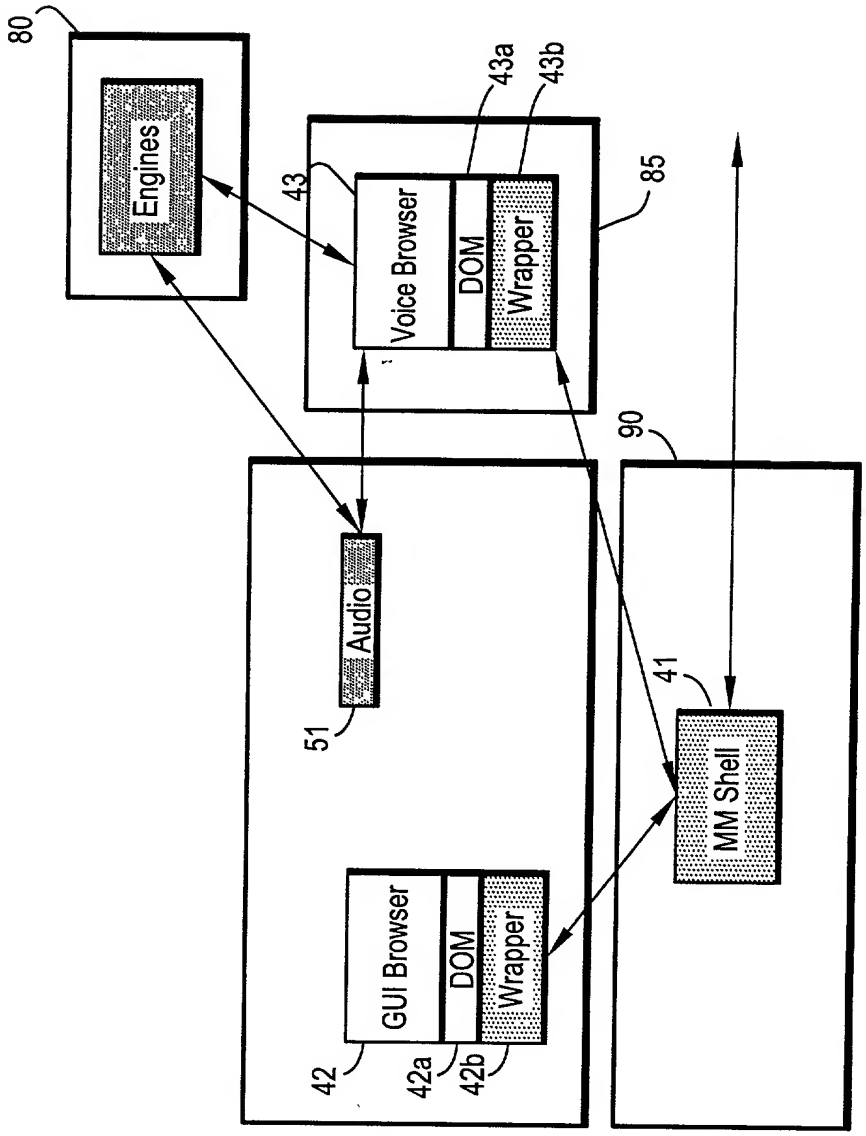
80
Engines
43
43a
43b
Voice Browser
DOM
Wrapper
85
90
Audio
51
41
MM Shell
GUI Browser
DOM
Wrapper
42
42a
42b

FIG. 10

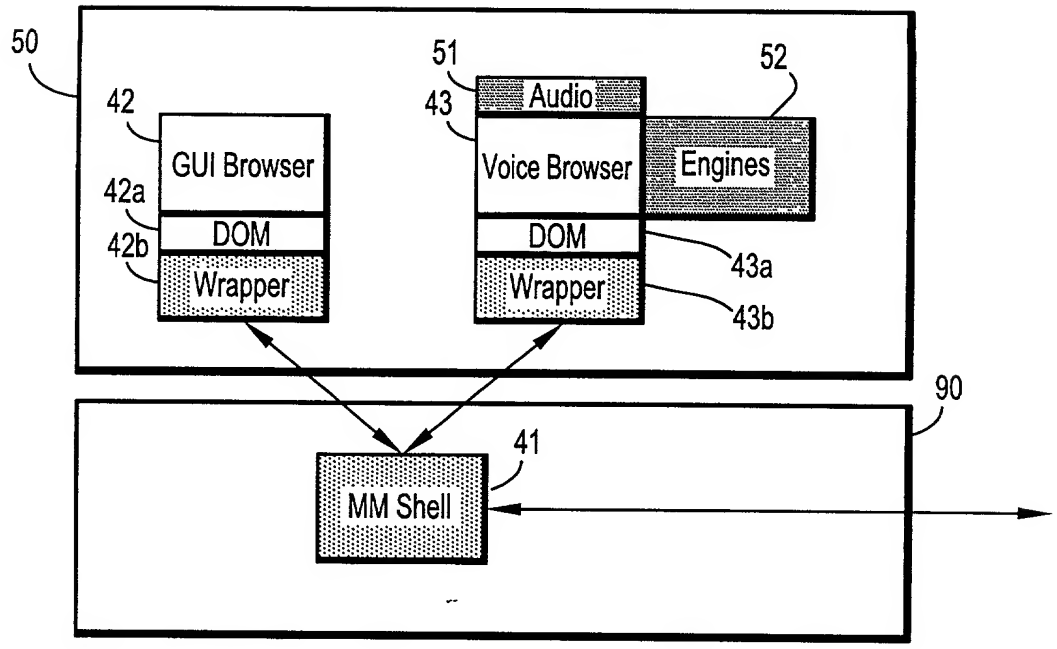
50
51
52
42
43
Audio
GUI Browser
Voice Browser
Engines
42a
DOM
DOM
42b
Wrapper
Wrapper
43a
43b
90
41
MM Shell

FIG. 11

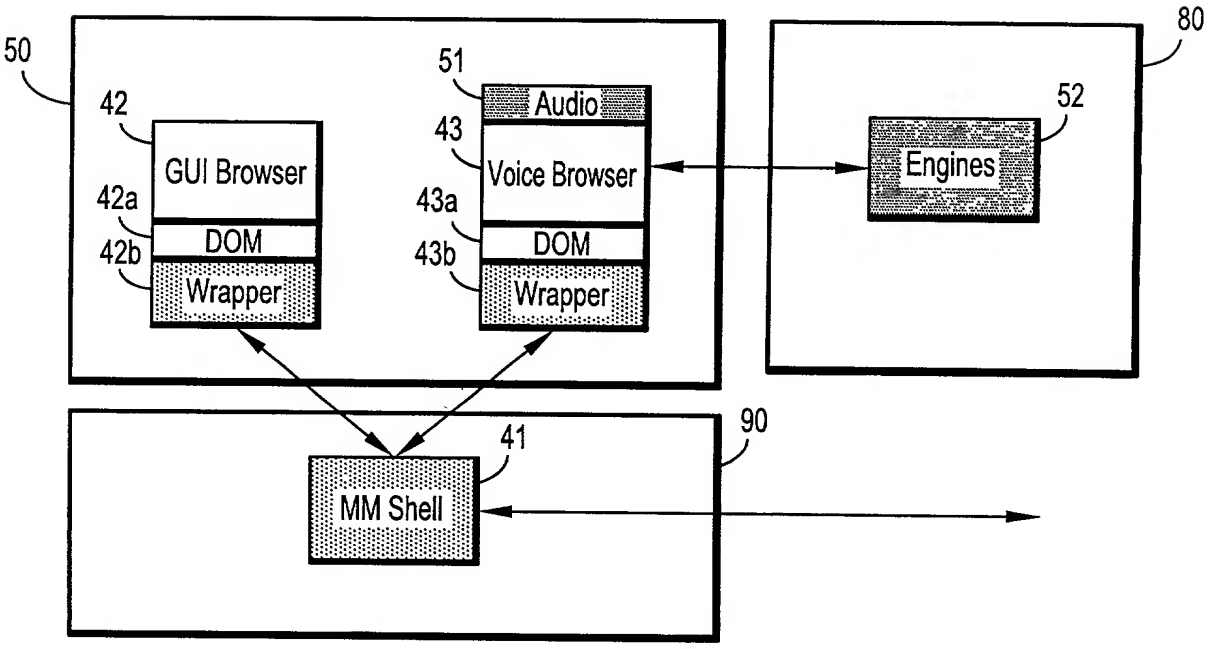
50
51
80
42
Audio
52
43
GUI Browser
Voice Browser
Engines
42a
43a
DOM
DOM
42b
43b
Wrapper
Wrapper
90
41
MM Shell

FIG. 12

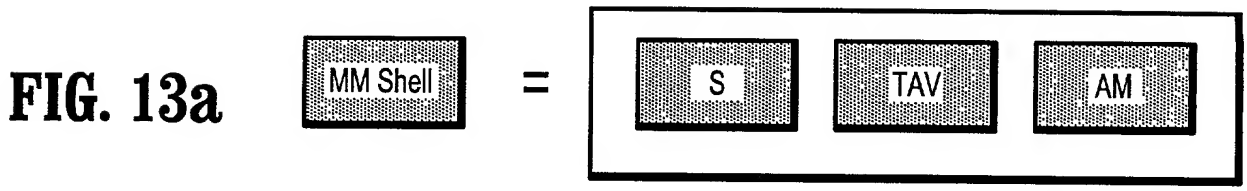

FIG. 13a

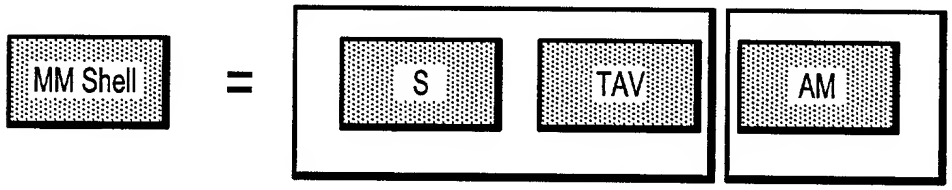

FIG. 13b

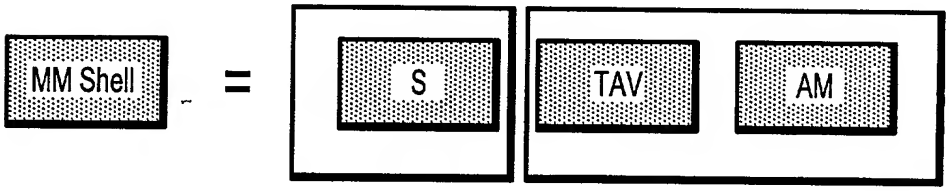

FIG. 13c

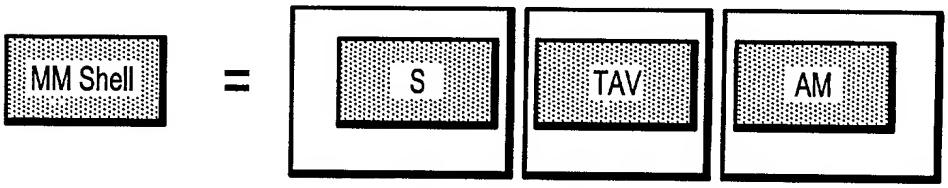

FIG. 13d

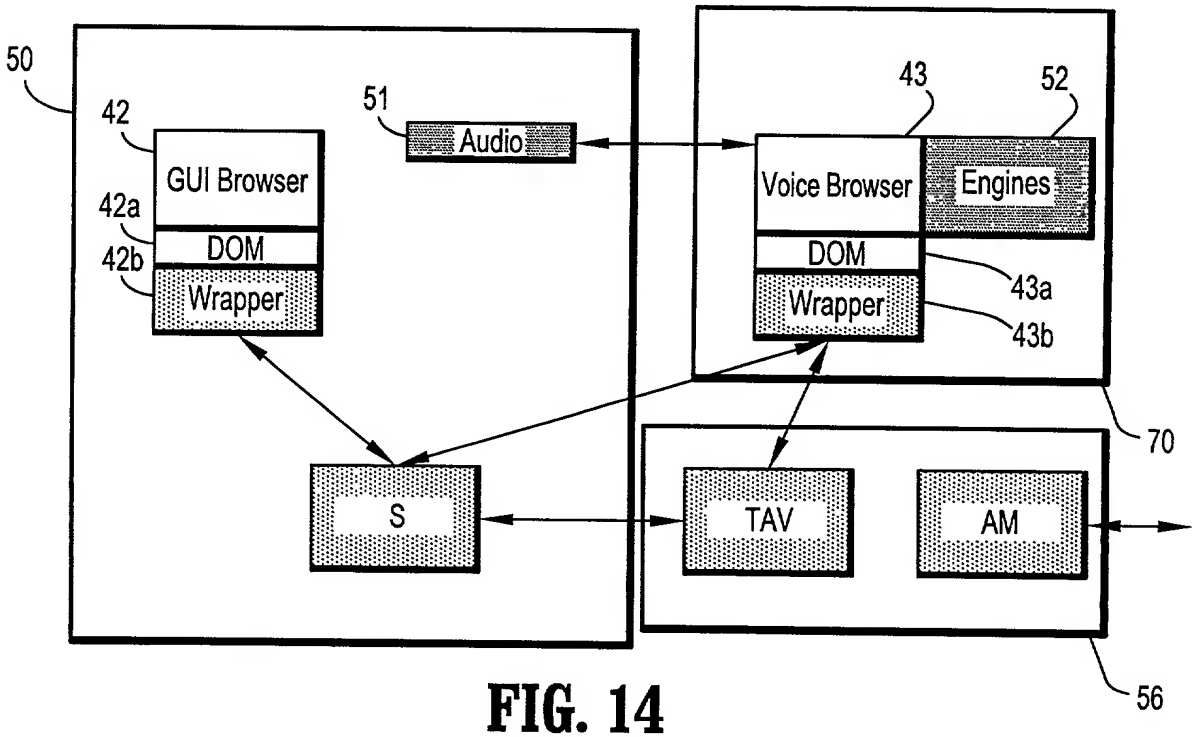

FIG. 14

20574.0 - 26/09/2003

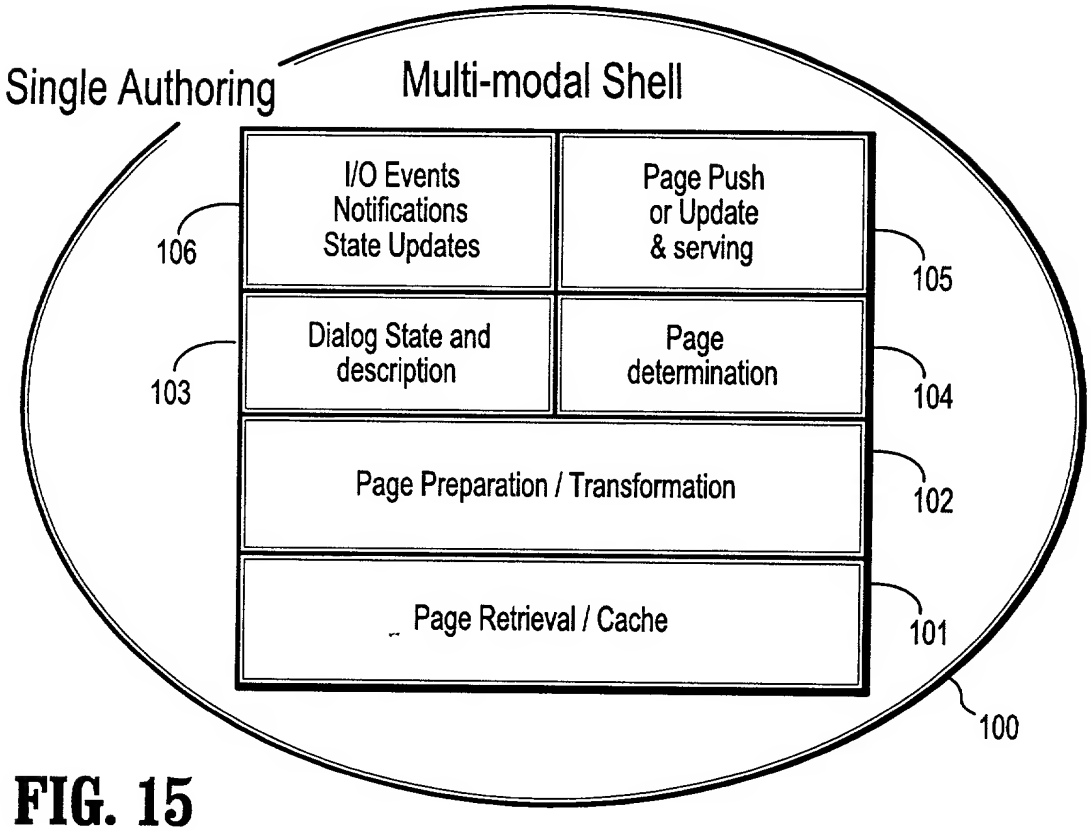

FIG. 15

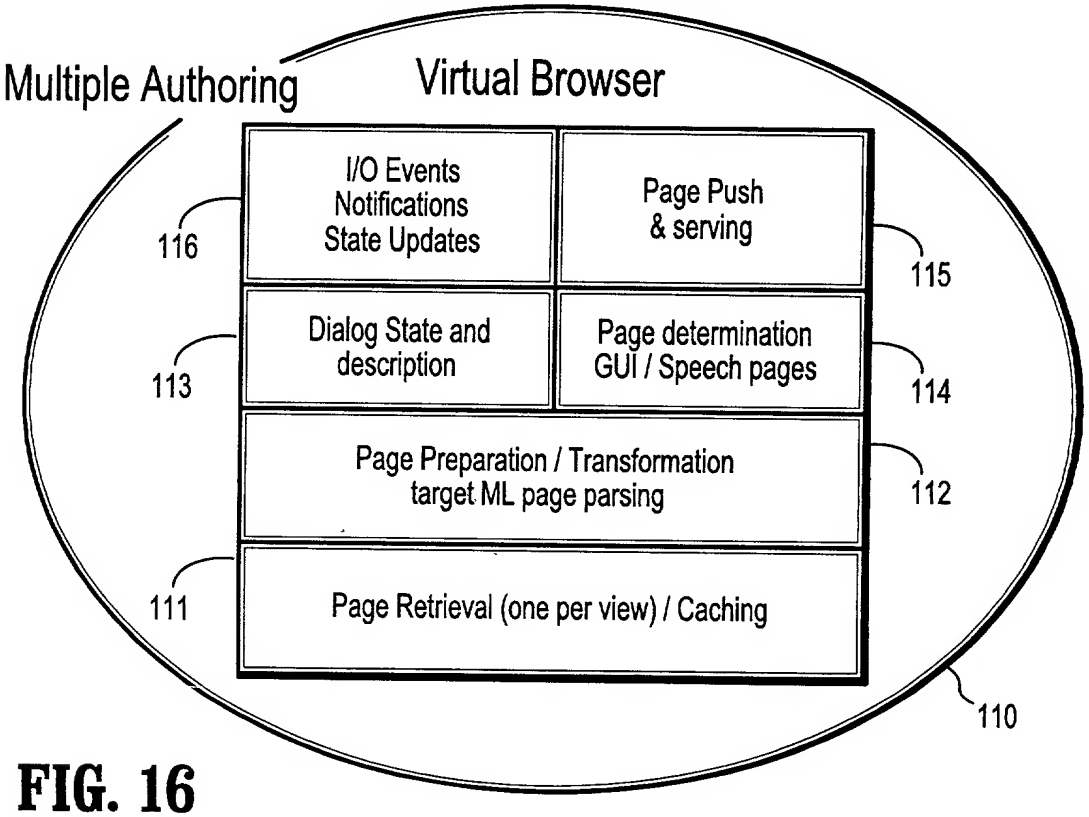

FIG. 16

20070294 "20070294

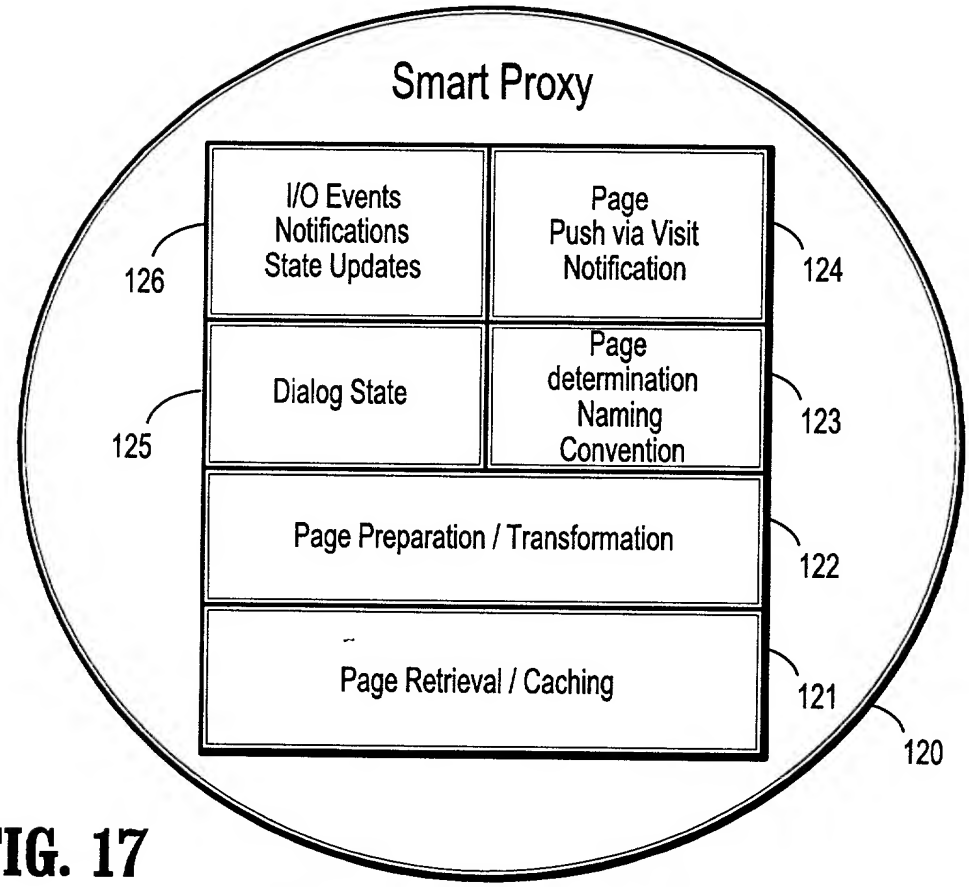

FIG. 17

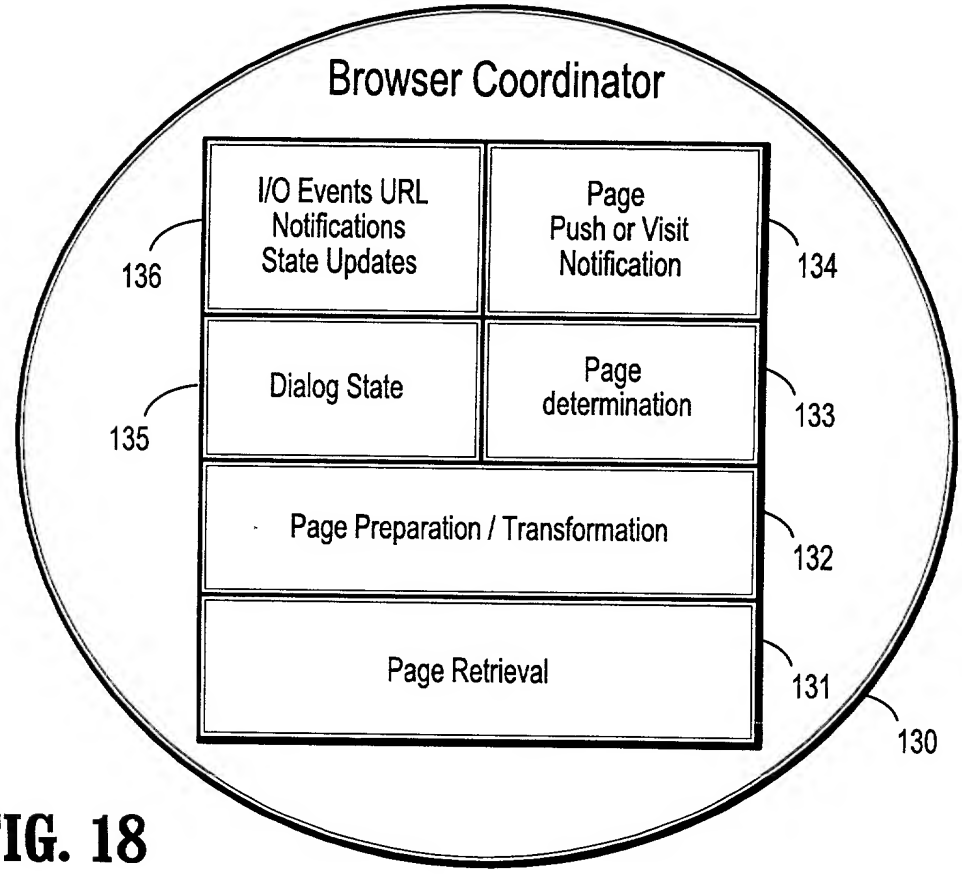

FIG. 18

20030225,20030071

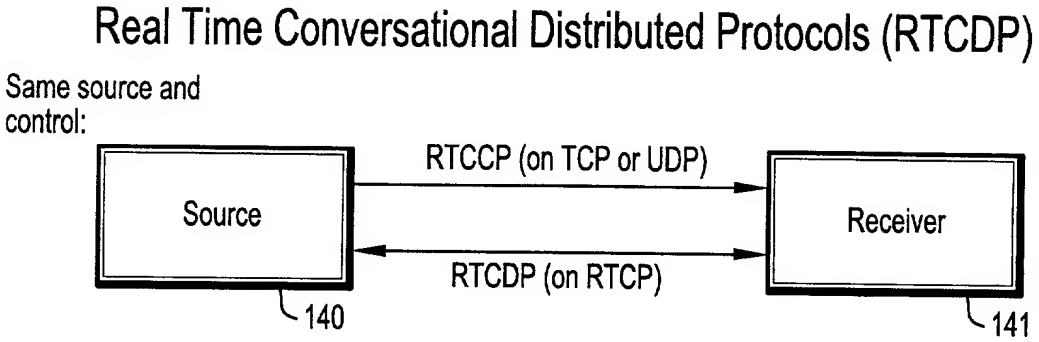
Real Time Conversational Distributed Protocols (RTCDP)
Same source and control:
Source
RTCCP (on TCP or UDP)
RTCDP (on RTCP)
Receiver
140
141

FIG. 19

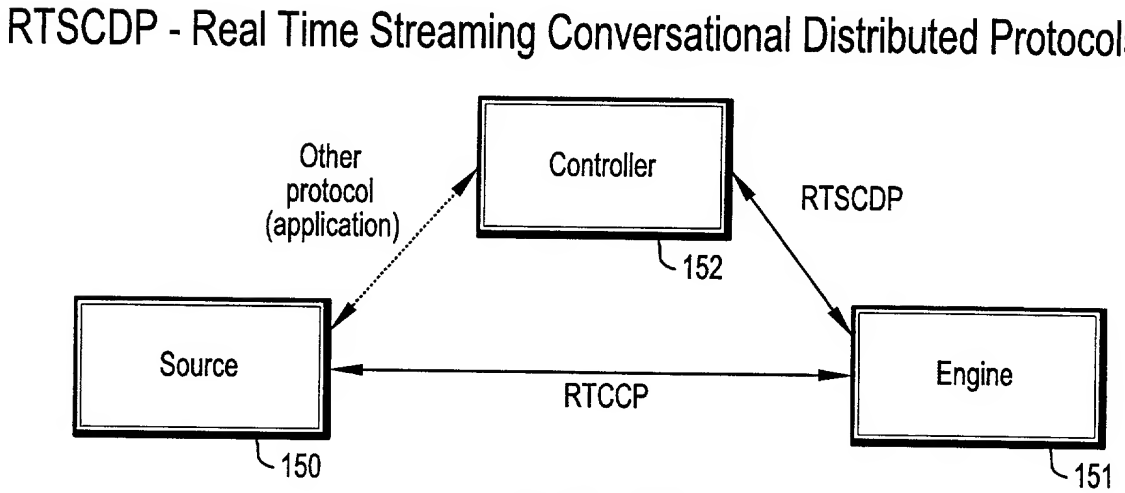
RTSCDP - Real Time Streaming Conversational Distributed Protocols
Other protocol (application)
Controller
RTSCDP
152
Source
RTCCP
Engine
150
151

FIG. 20

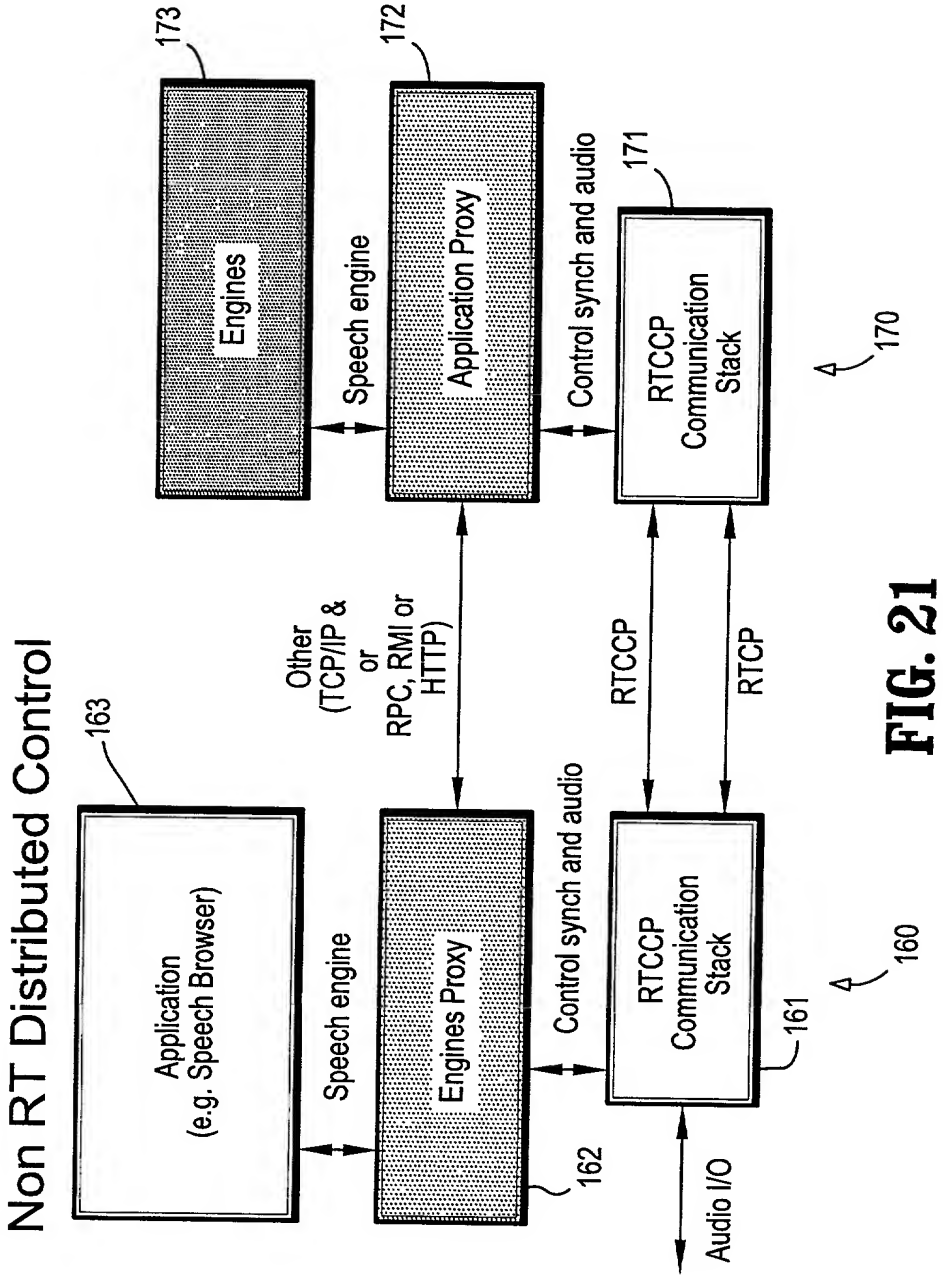
Non RT Distributed Control
Application
(e.g. Speech Browser)
163
Speech engine
Engines Proxy
162
Control synch and audio
RTCCP
Communication
Stack
161
160
Audio I/O
Other
(TCP/IP &
or
RPC, RMI or
HTTP)
RTCCP
RTCP
Engines
173
Speech engine
Application Proxy
172
Control synch and audio
RTCCP
Communication
Stack
171
170

FIG. 21

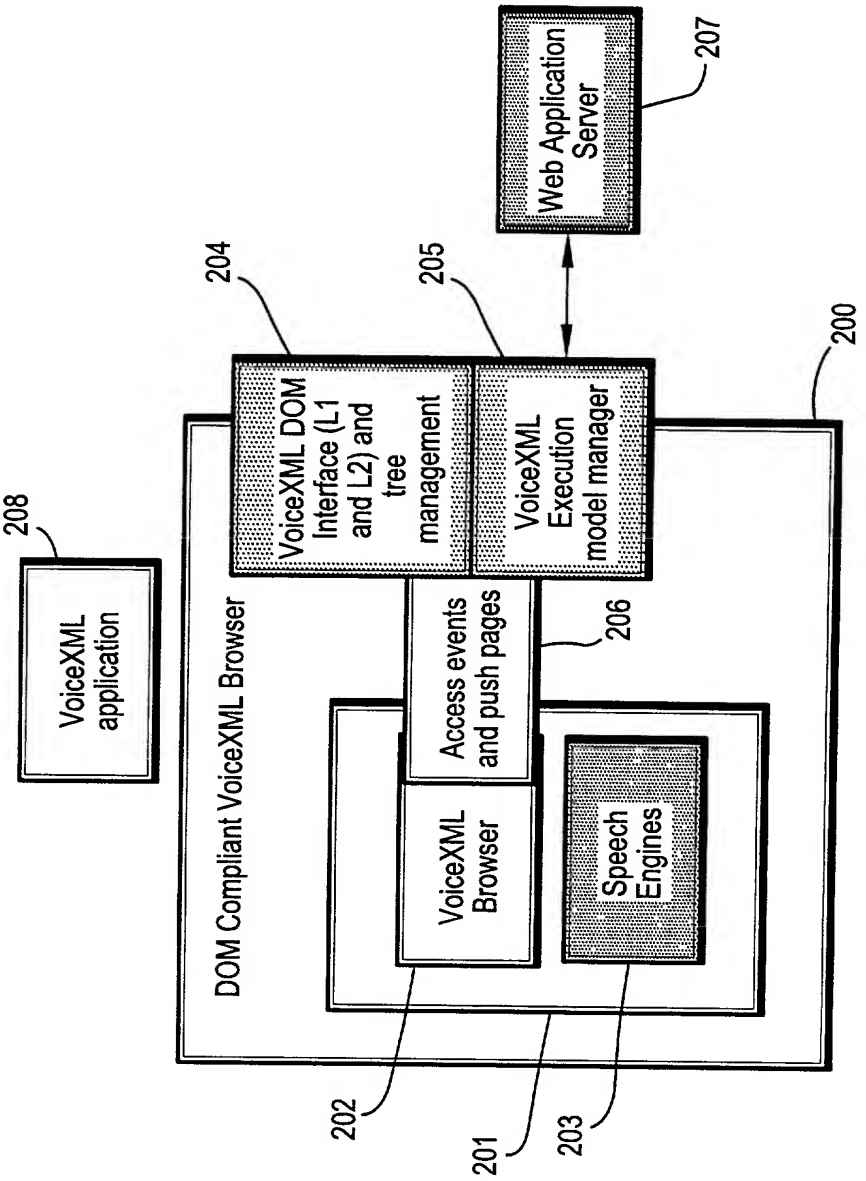
Web Application Server
207
204
205
200
VoiceXML DOM Interface (L1 and L2) and tree management
VoiceXML Execution model manager
208
VoiceXML application
DOM Compliant VoiceXML Browser
Access events and push pages
206
VoiceXML Browser
Speech Engines
202
201
203

FIG. 22

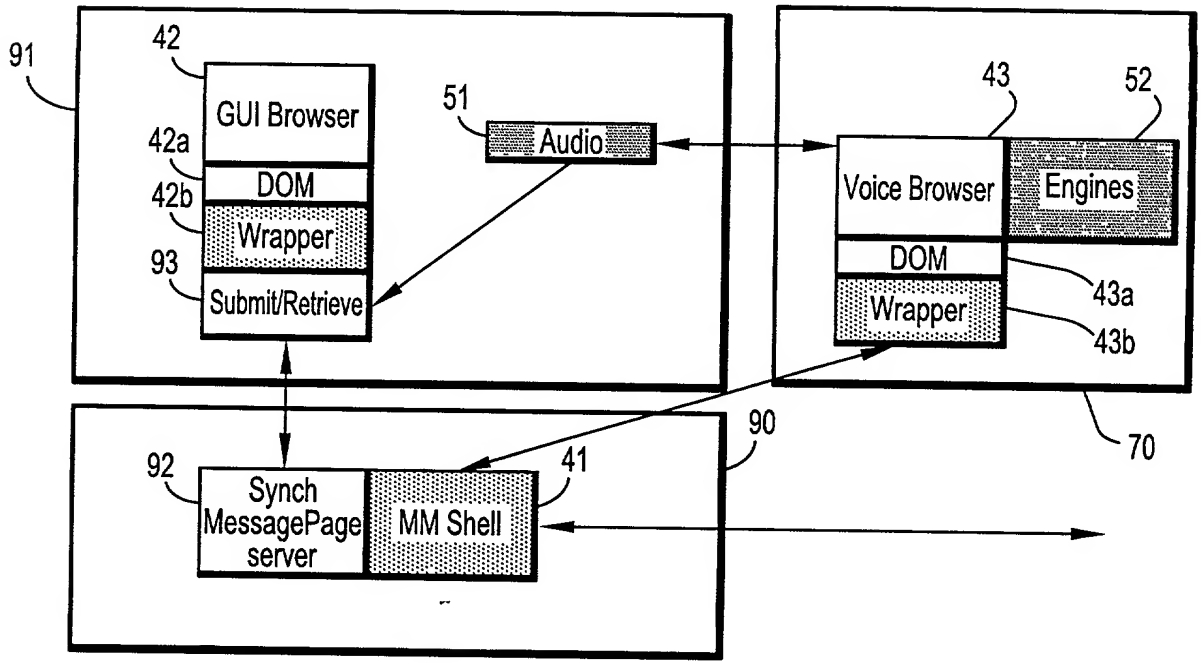

FIG. 23

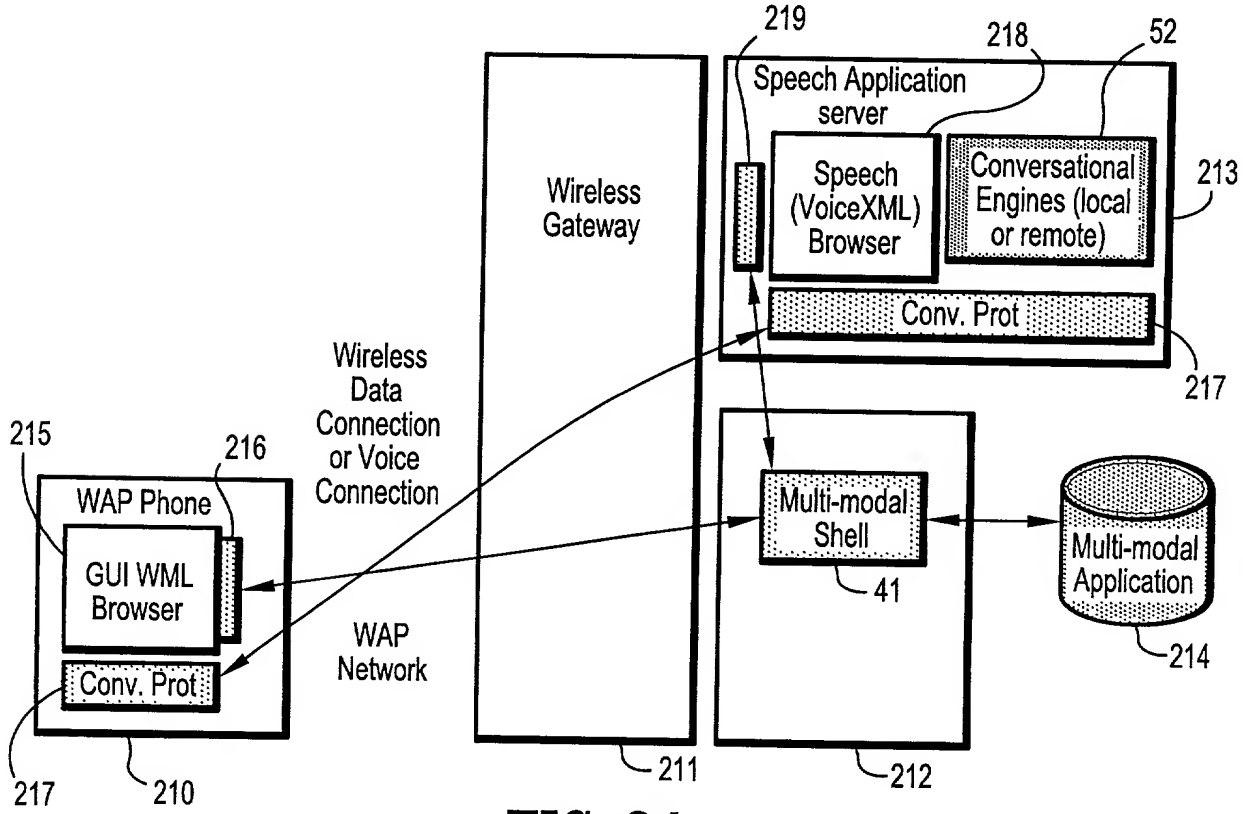

FIG. 24

20517.0 - 26.2.2007

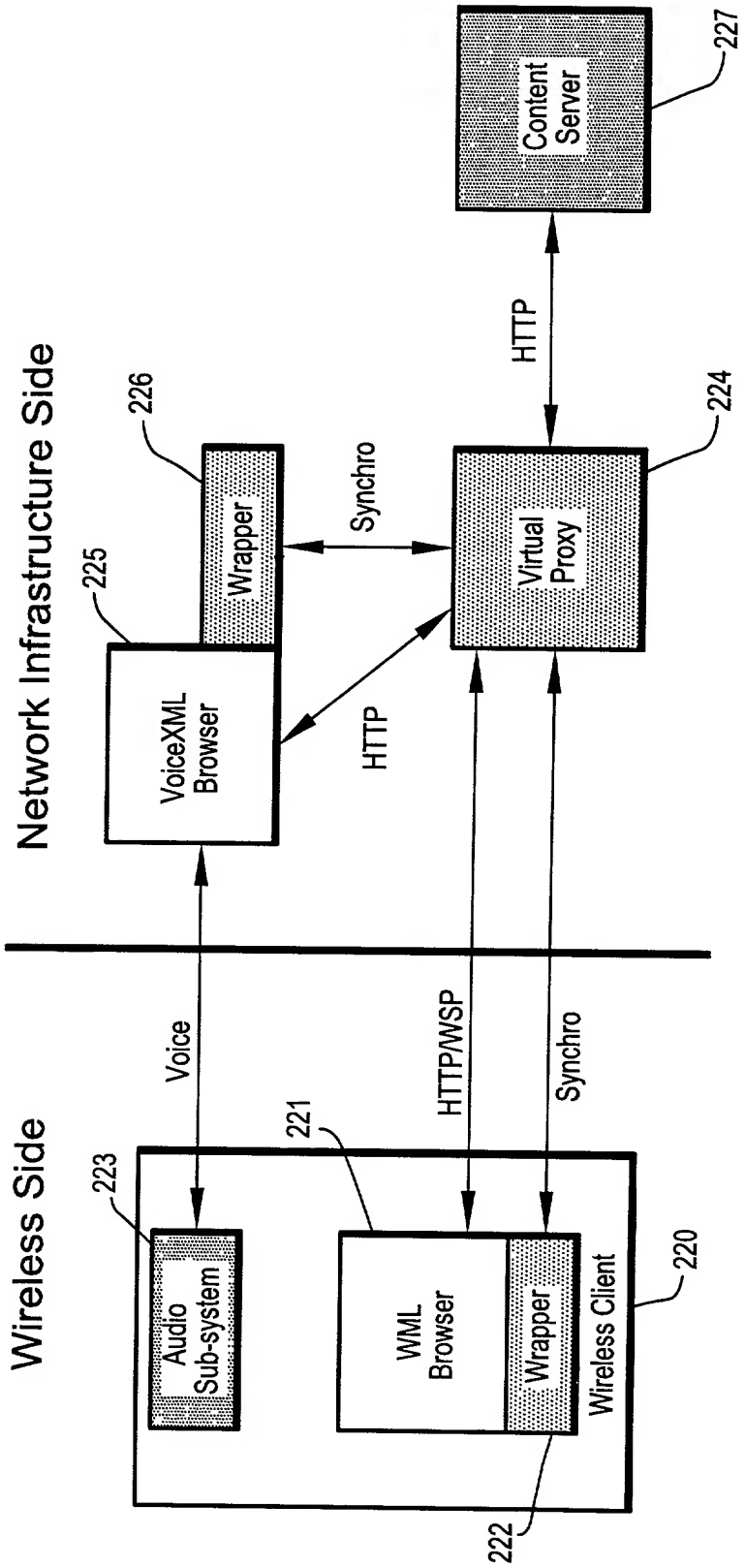
Network Infrastructure Side
Wireless Side
Content Server
227
HTTP
226
Wrapper
Synchro
224
Virtual Proxy
225
VoiceXML Browser
HTTP
Voice
HTTP/WSP
Synchro
221
223
Audio Sub-system
WML Browser
Wrapper
Wireless Client
220
222

FIG. 25

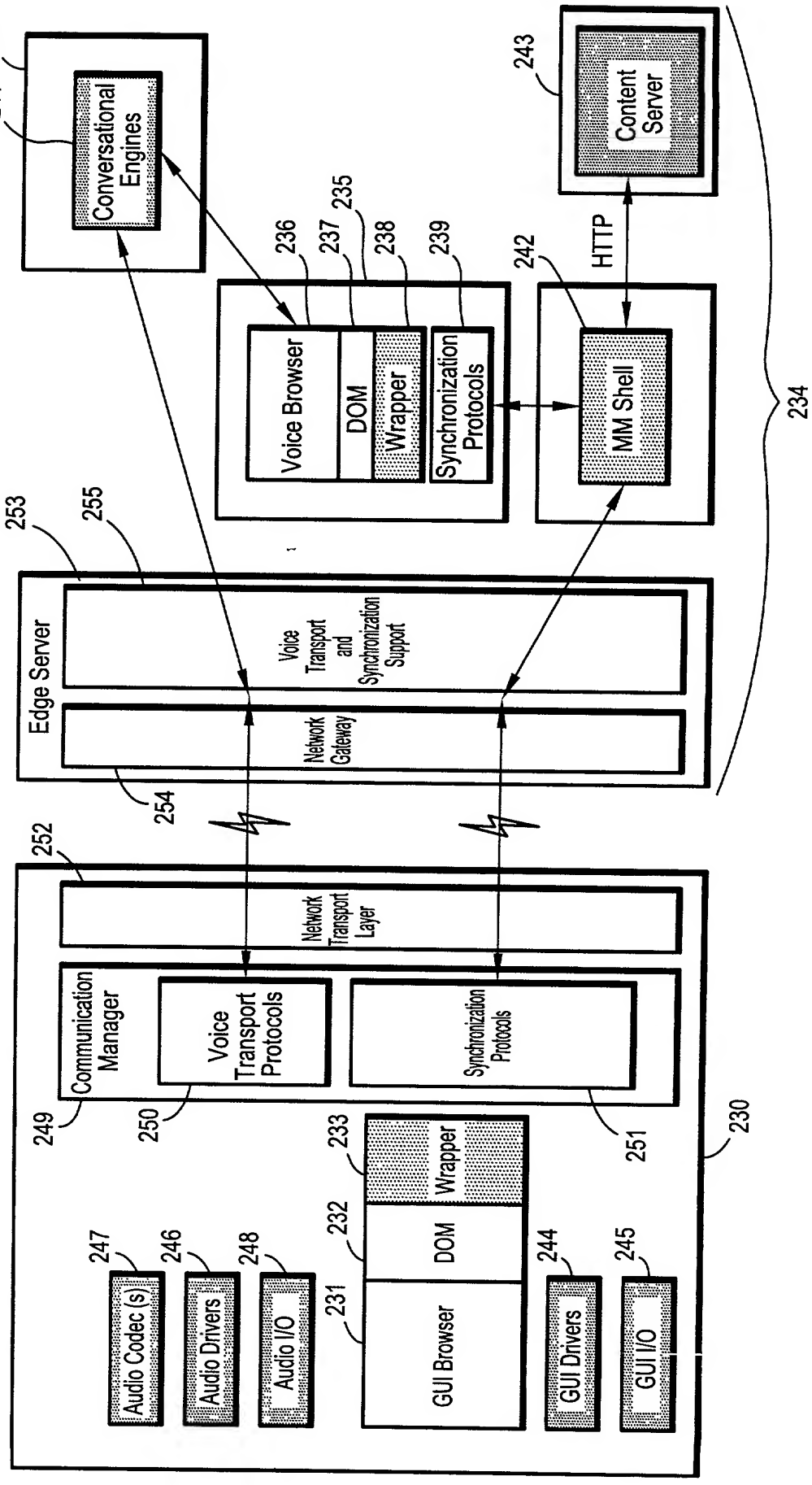
240
241
Conversational Engines
243
Content Server
235
236
237
238
239
242
HTTP
Voice Browser
DOM
Wrapper
Synchronization Protocols
MM Shell
234
253
255
Edge Server
Voice Transport and Synchronization Support
Network Gateway
254
252
Network Transport Layer
Communication Manager
Voice Transport Protocols
Synchronization Protocols
249
250
251
230
233
Wrapper
232
DOM
GUI Browser
231
247
246
248
244
245
Audio Codec (s)
Audio Drivers
Audio I/O
GUI Drivers
GUI I/O

FIG. 26

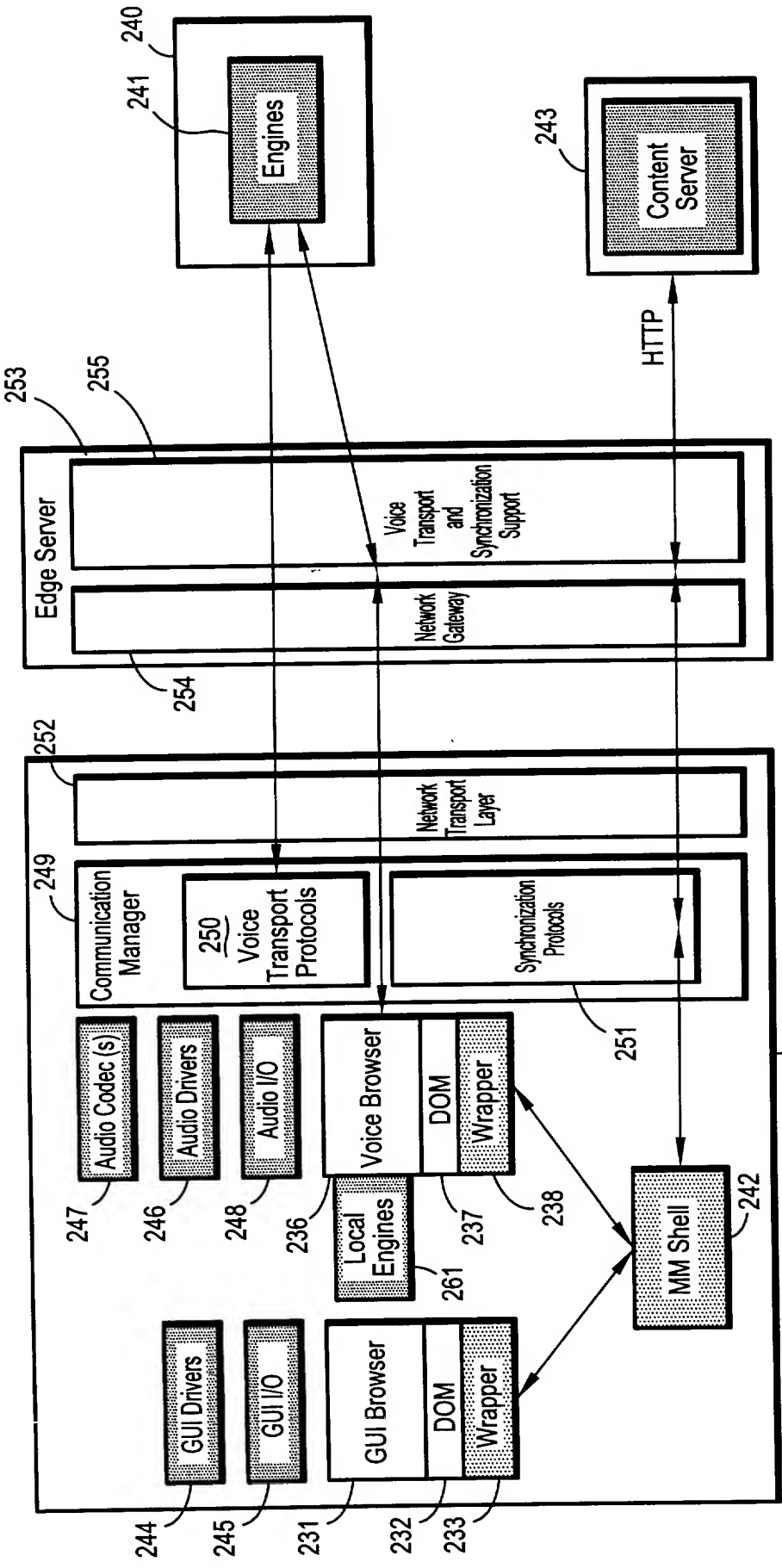
240
241
Engines
243
Content Server
HTTP
253
255
Edge Server
Voice Transport and Synchronization Support
Network Gateway
254
252
Network Transport Layer
249
Communication Manager
250
Voice Transport Protocols
Synchronization Protocols
251
260
Audio Codec (s)
Audio Drivers
Audio I/O
Voice Browser
DOM
Wrapper
247
246
248
236
237
238
Local Engines
261
MM Shell
242
GUI Drivers
GUI I/O
GUI Browser
DOM
Wrapper
244
245
231
232
233

FIG. 27

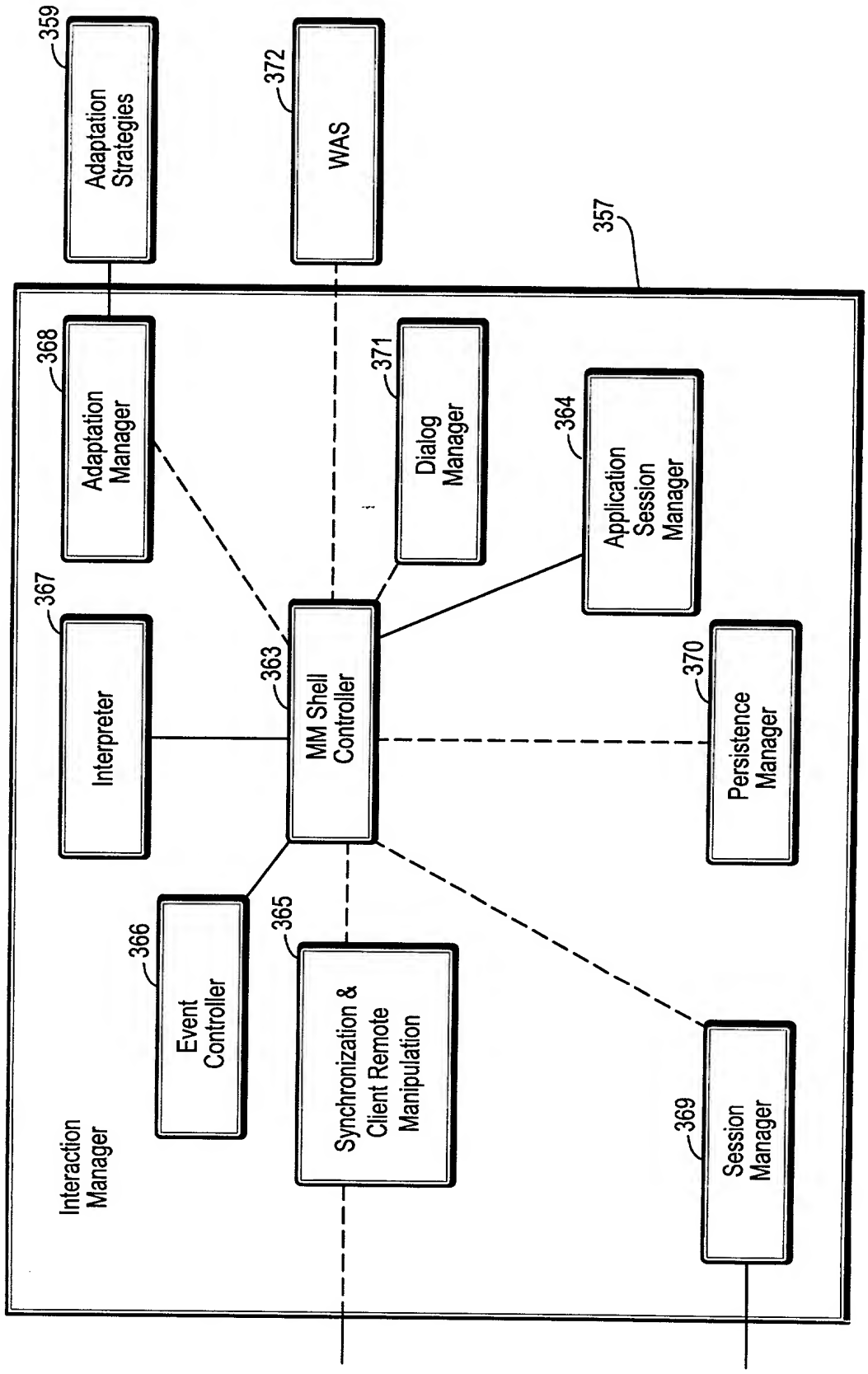
359
Adaptation Strategies
372
WAS
357
368
Adaptation Manager
371
Dialog Manager
364
Application Session Manager
367
Interpreter
363
MM Shell Controller
370
Persistence Manager
366
Event Controller
365
Synchronization & Client Remote Manipulation
369
Session Manager
Interaction Manager

FIG. 28